

FIG. 1

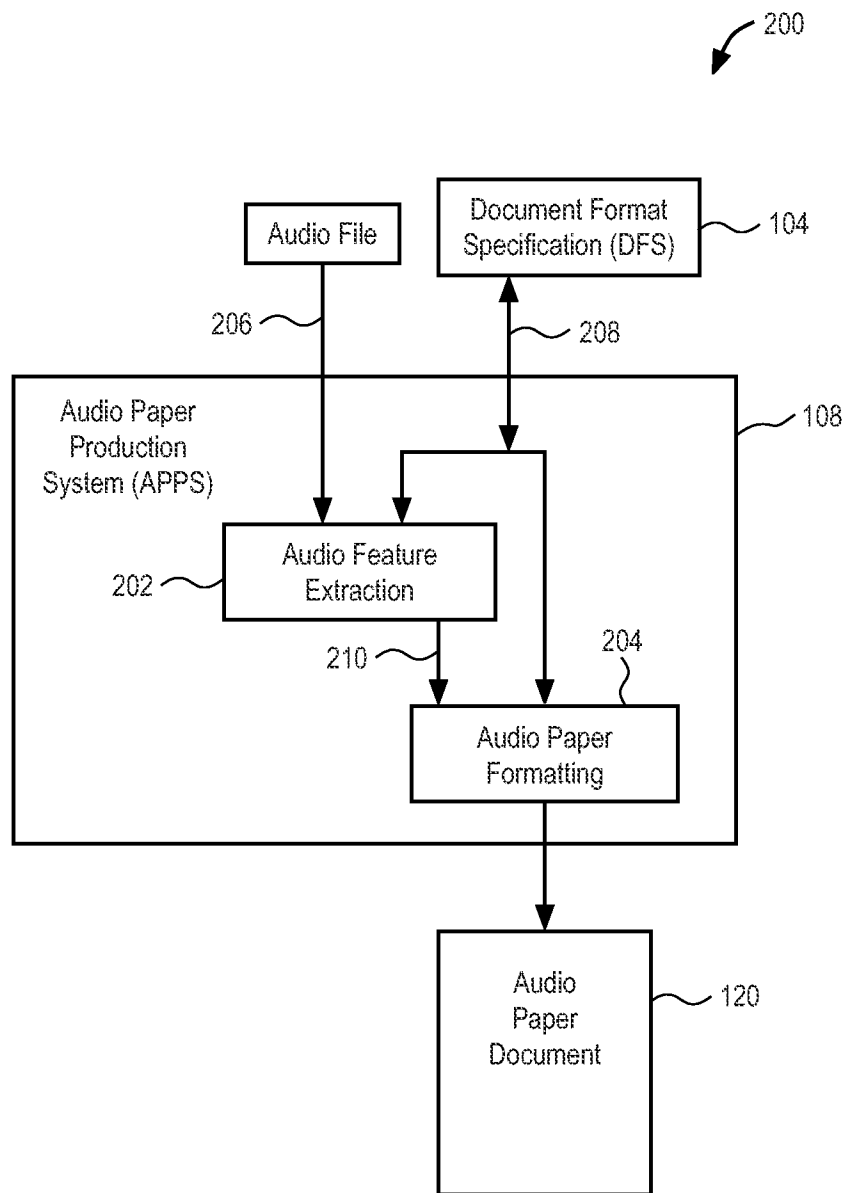


FIG. 2

APPS Processing Steps

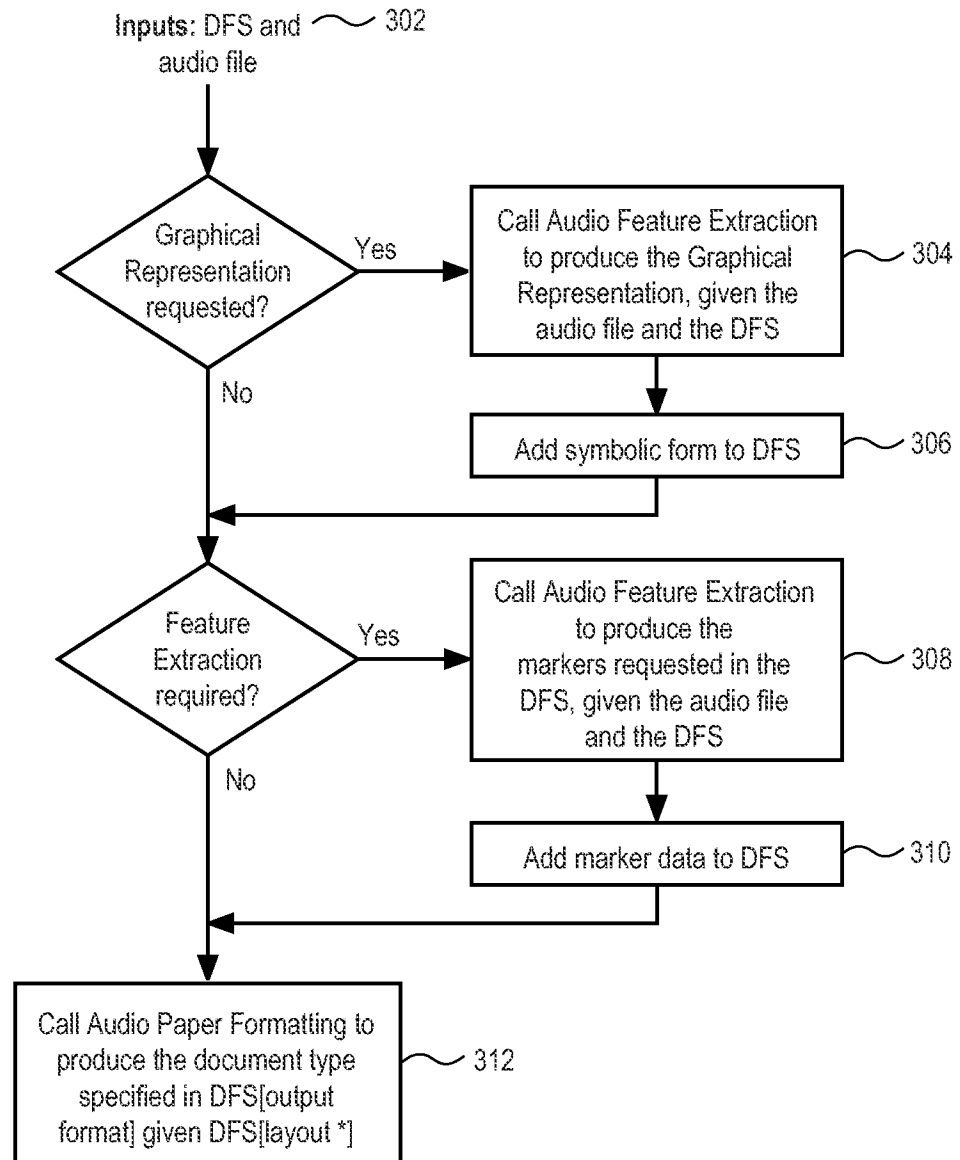


FIG. 3

Audio Paper Formatting module

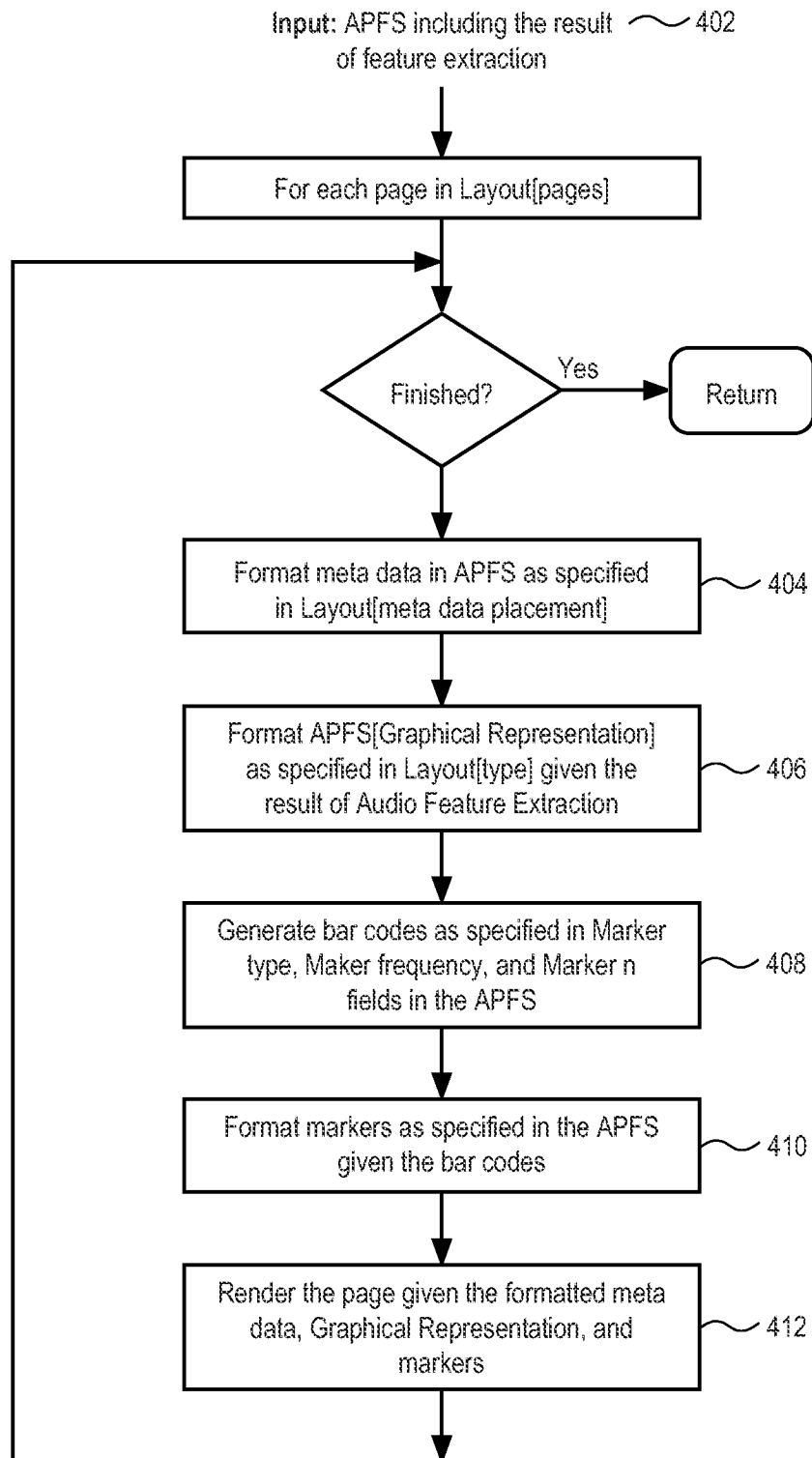


FIG. 4

Bar code generation

Inputs:

- Bar code type (e.g., Interleaved 2 of 5),
- No. of Identifier digits in bar code, ~ 502
- No. of time stamp digits in bar code,
- Time stamp value

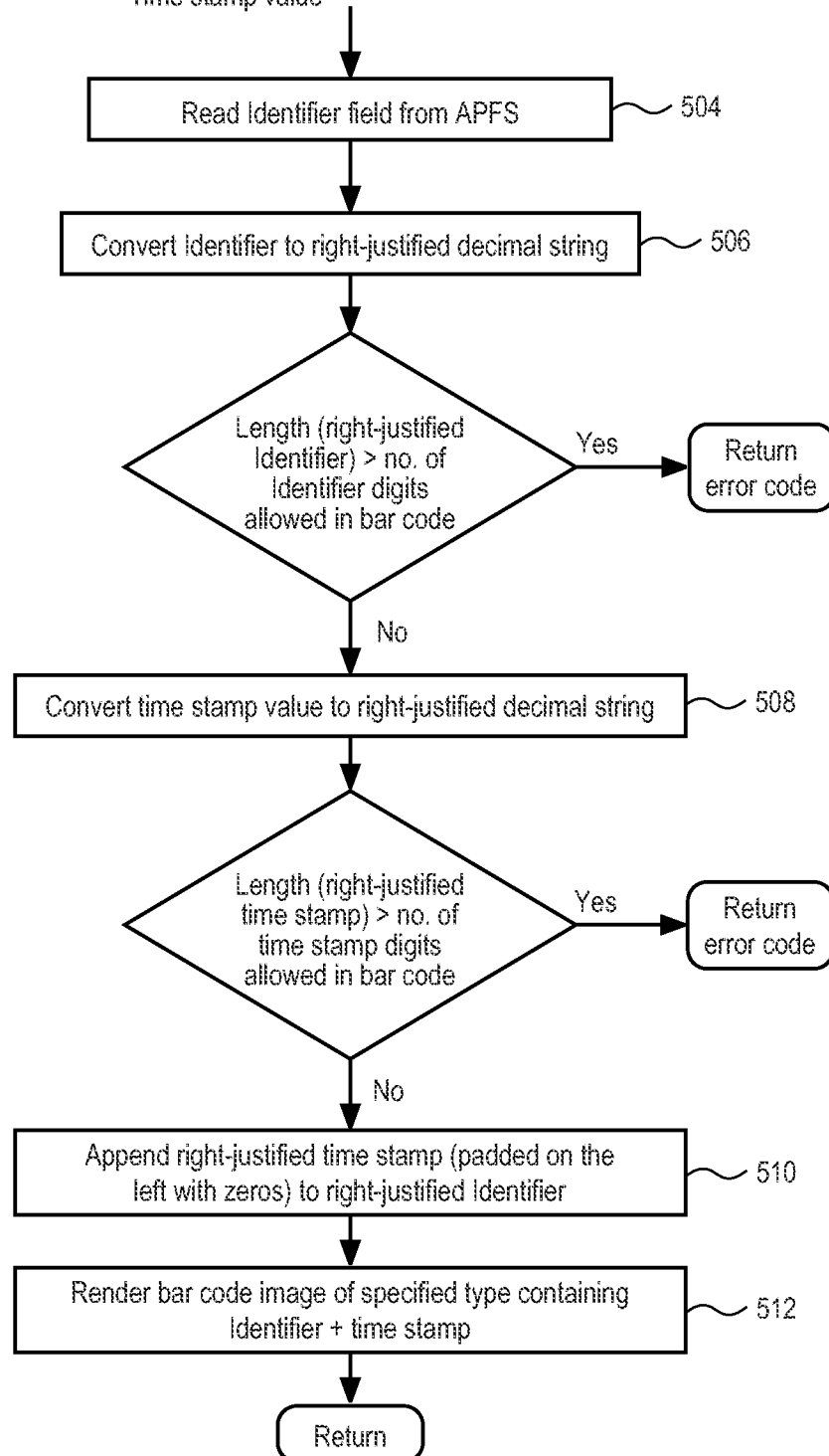


FIG. 5

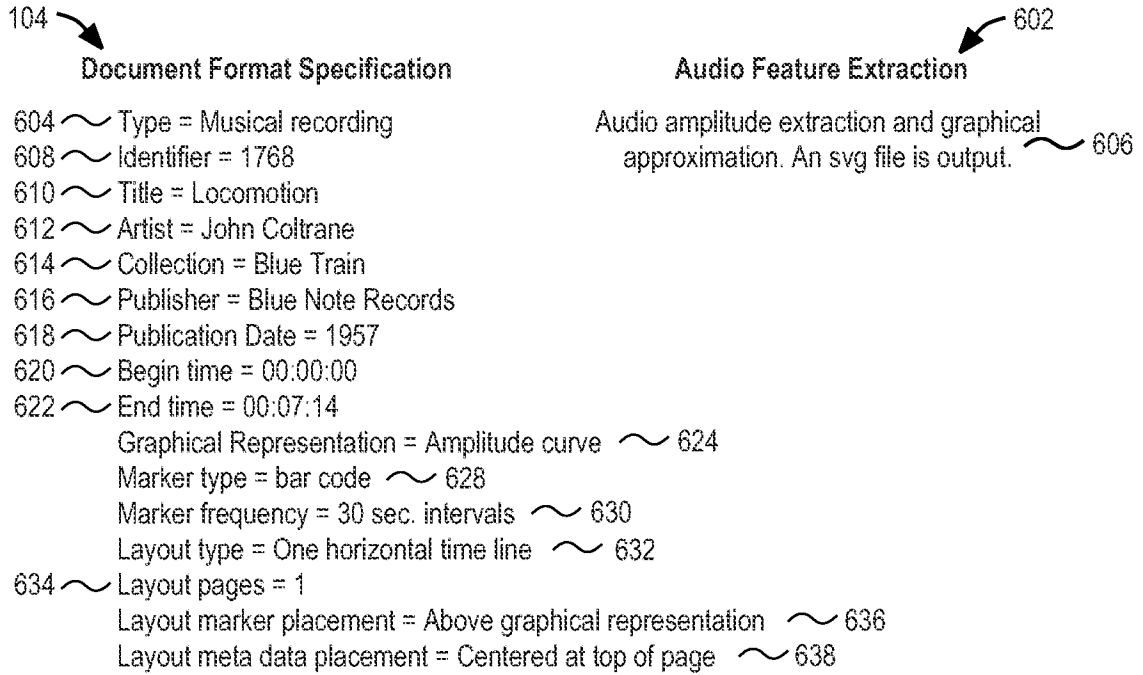


FIG. 6a

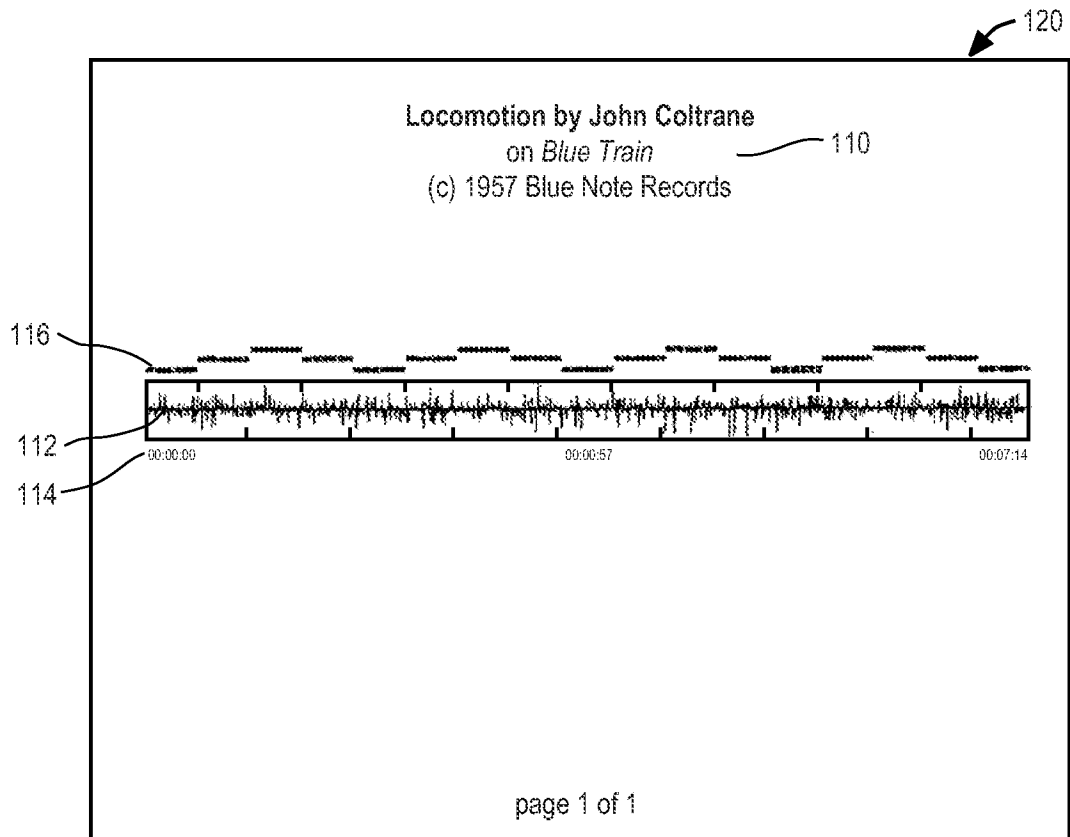


FIG. 6b

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Document Format Specification

Type = Musical recording
 Identifier = 1769
 Title = Locomotion
 Artist = John Coltrane
 Collection = Blue Train
 Publisher = Blue Note Records
 Publication Date = 1957
 Begin time = 00:00:00
 End time = 00:07:14
 Graphical Representation = Amplitude curve

702 ~ Feature extraction = Musical solos (output is instrument name and time when solo began)

704 ~ Marker type 1 = Instrument name above bar code above time stamp

706 ~ Marker type 2 = bar code

708 ~ Marker2 frequency = 0, 50%, 100%

Layout type = One horizontal time line

Layout pages = 1

Layout marker 1 placement = Above graphical representation ~ 710

Layout marker 2 placement = Below time line ~ 712

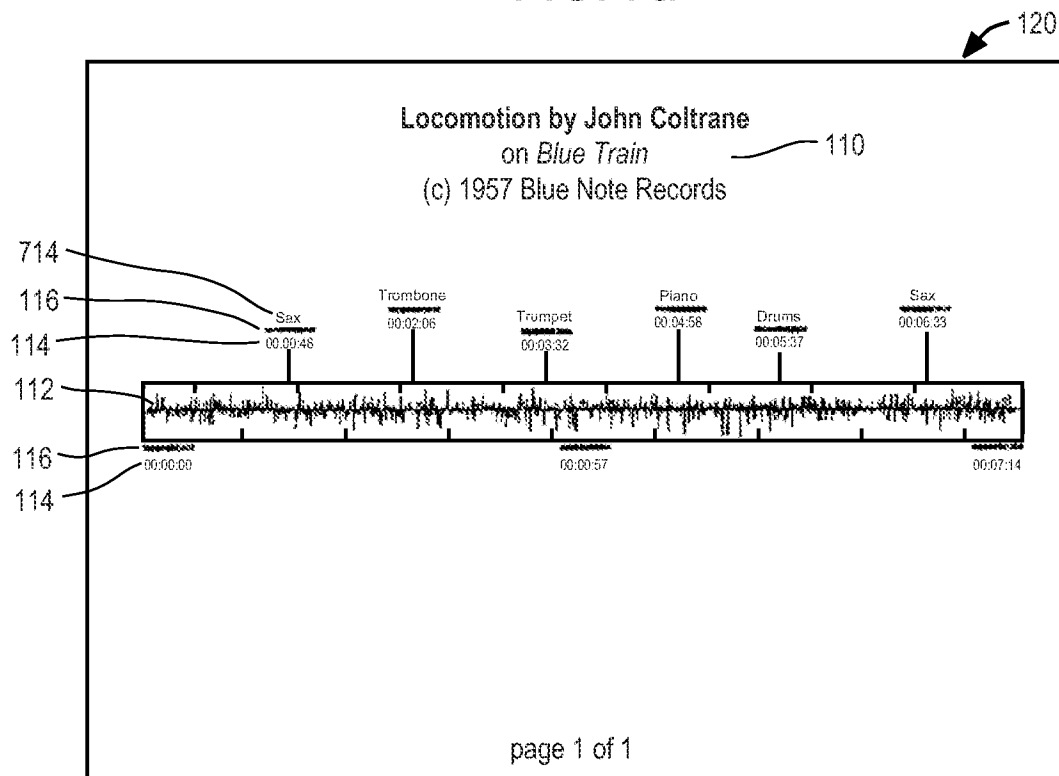
Layout meta data placement = Centered at top of page

Audio Feature Extraction

Audio amplitude extraction and graphical approximation. An svg file is output. Musical Solo extraction is also applied. It outputs the beginning times and instrument for each musical solo.

602

606

FIG. 7a**FIG. 7b**

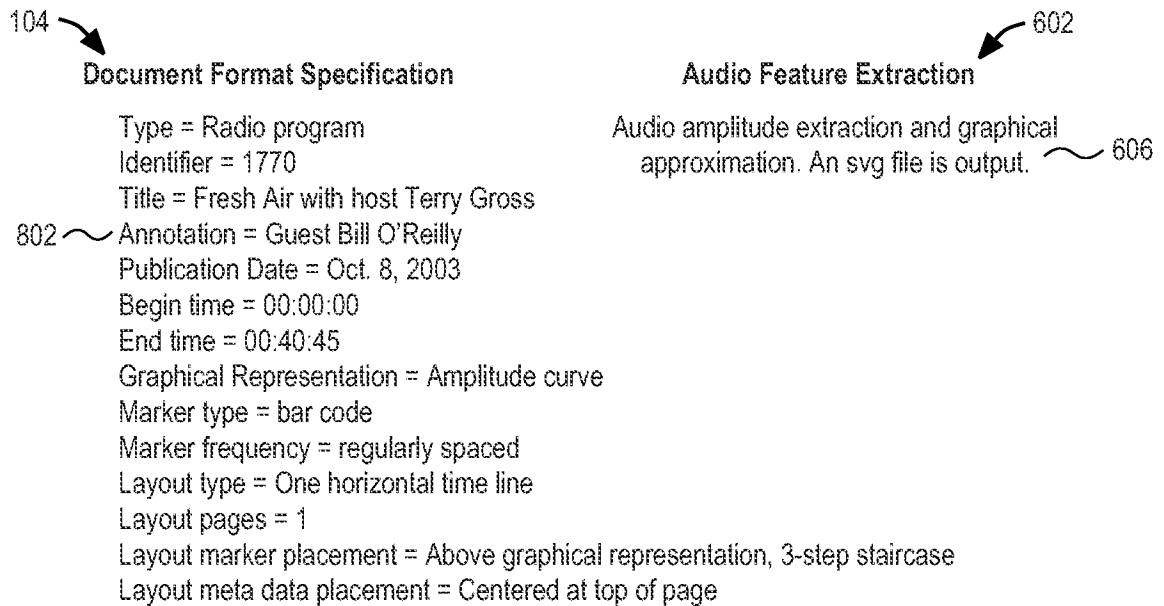


FIG. 8a

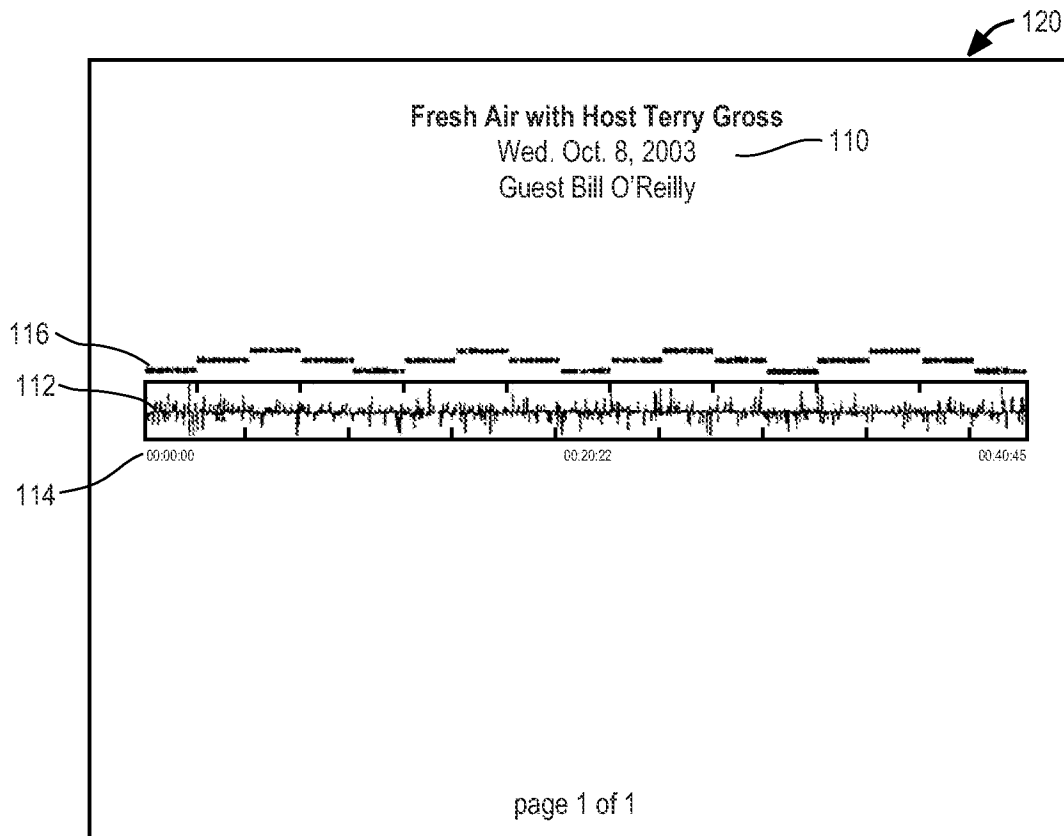


FIG. 8b

104

Document Format Specification

Type = Radio program
 Identifier = 1771
 Title = Fresh Air with host Terry Gross
 Annotation = Guest Bill O'Reilly
 Publication Date = Oct. 8, 2003
 Begin time = 00:00:00
 End time = 00:40:45
 Graphical Representation = Amplitude curve

628 ~ Marker type = keywords, bar code, time stamp

Marker placement = above time line

630 ~ Marker frequency = user-defined

902

Marker 1 = (WTC, bar code, 04:28, vert. pos. 1)

Marker 2 = (NY Times, bar code, 09:08, vert. pos. 2)

Marker 3 = (Peabody, bar code, 12:30, vert. pos. 3)

...

Marker 11 = (People Mag, bar code, 39:10, vert. pos. 3)

Layout type = One horizontal time line

Layout pages = 1

Layout marker placement = Above graphical representation, as provided

Layout meta data placement = Centered at top of page

Audio Feature Extraction

Audio amplitude extraction and graphical approximation. An svg file is output.

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FIG. 9a

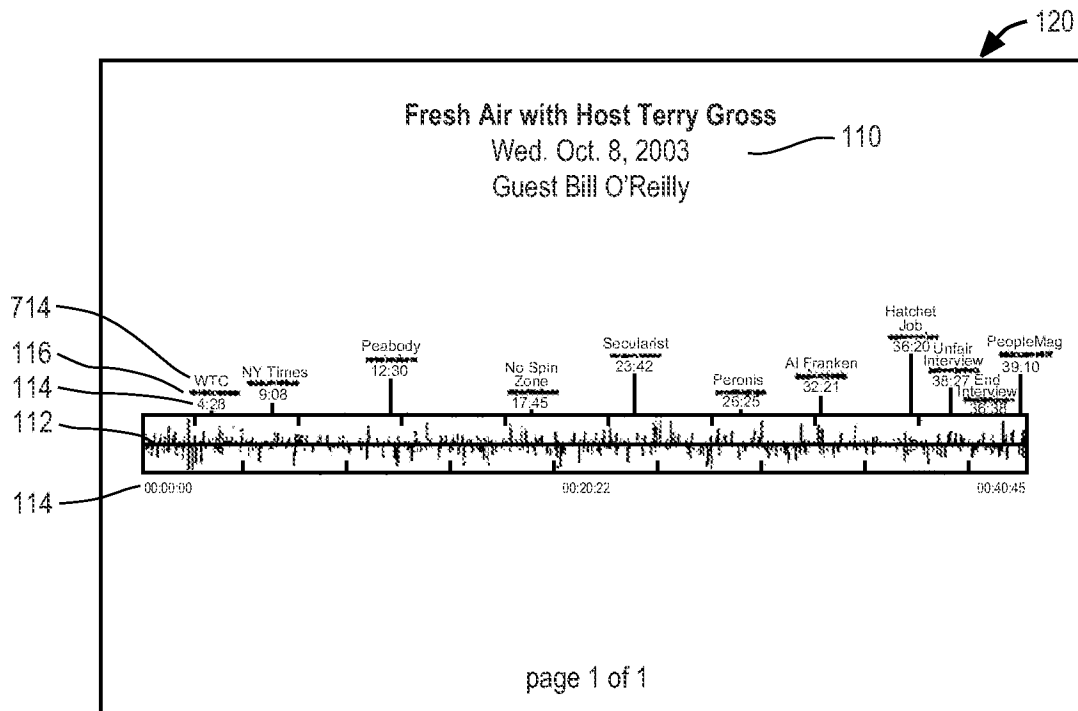


FIG. 9b

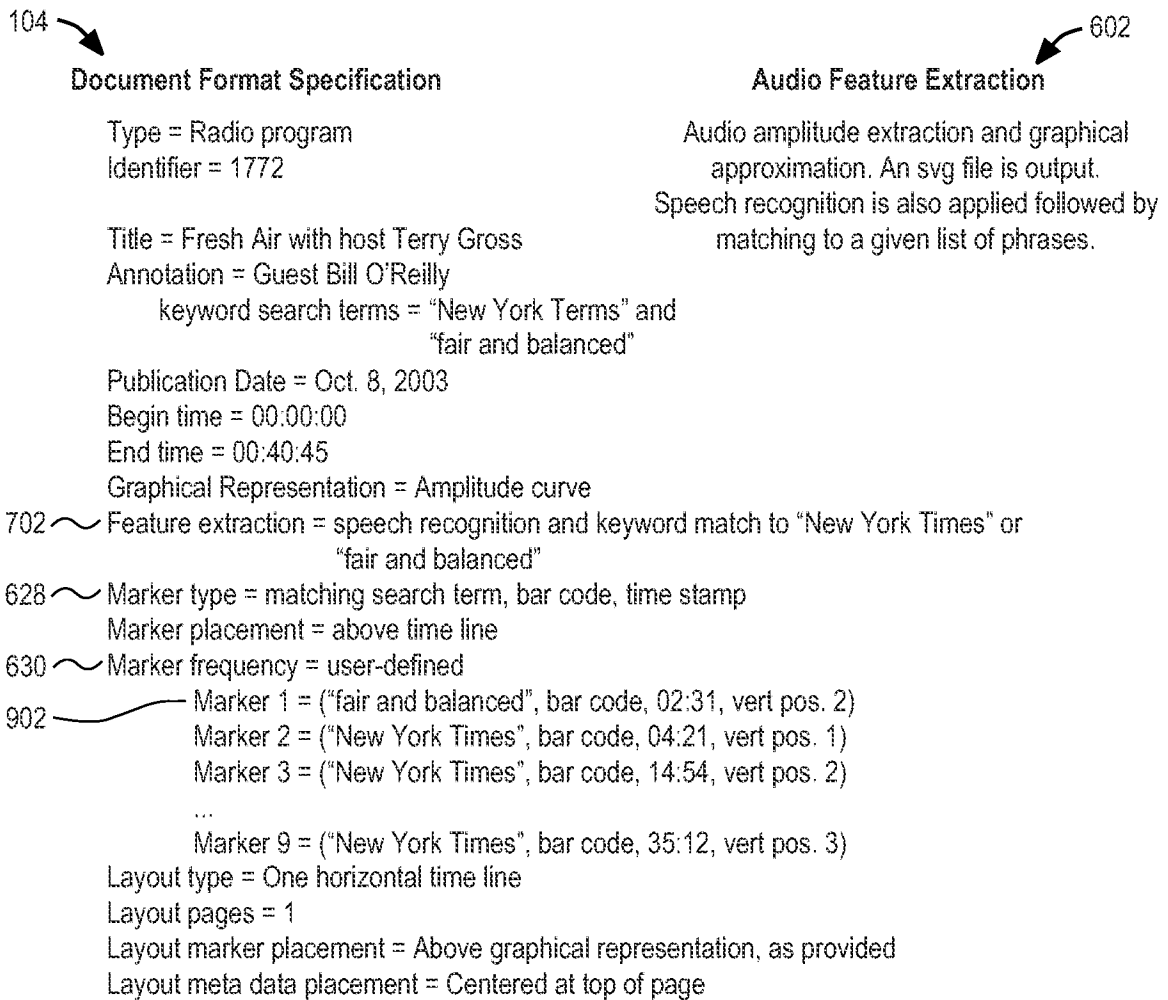


FIG. 10a

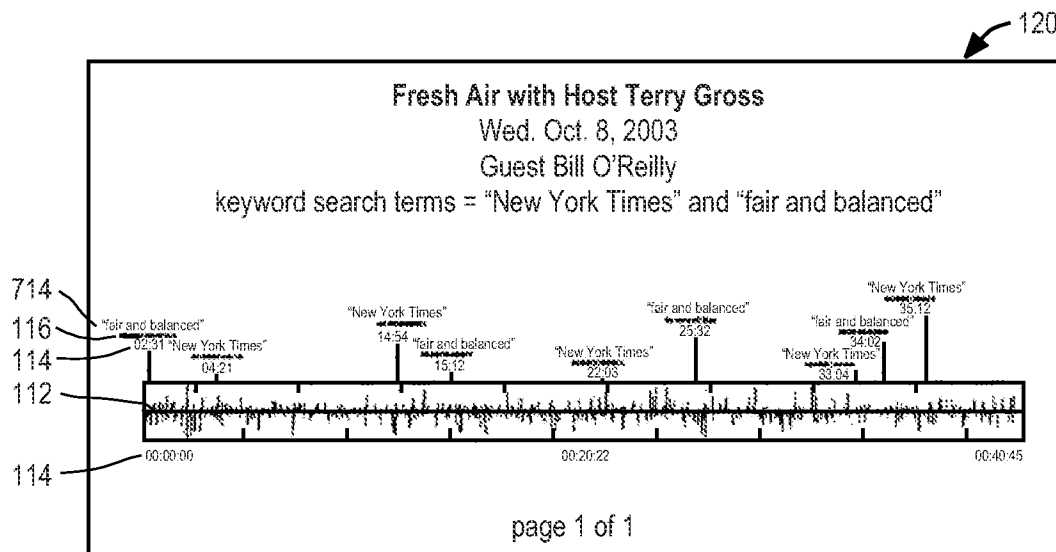


FIG. 10b

104

Document Format Specification

Type = Radio program

Identifier = 1773

Title = A Prairie Home Companion

Annotation = applause events shown

Publication Date = Sun. Oct. 12, 2003

Begin time = 00:00:00

End time = 01:58:56

Graphical Representation = Amplitude curve

702 ~ Feature extraction = applause detection $\alpha=0.27$ $\beta=1.86$

Marker type = time stamp, bar code

Marker placement = above time line

Marker frequency = user-defined

Marker 1 = (00:02:13, bar code, pos. 1)

Marker 2 = (00:10:54, bar code, pos. 2)

Marker 3 = (00:12:32, bar code, pos. 3)

...

Marker 16 = (01:56:01, bar code, pos. 2)

Layout type = One horizontal time line

Layout pages = 1

Layout marker placement = Above graphical representation, as provided

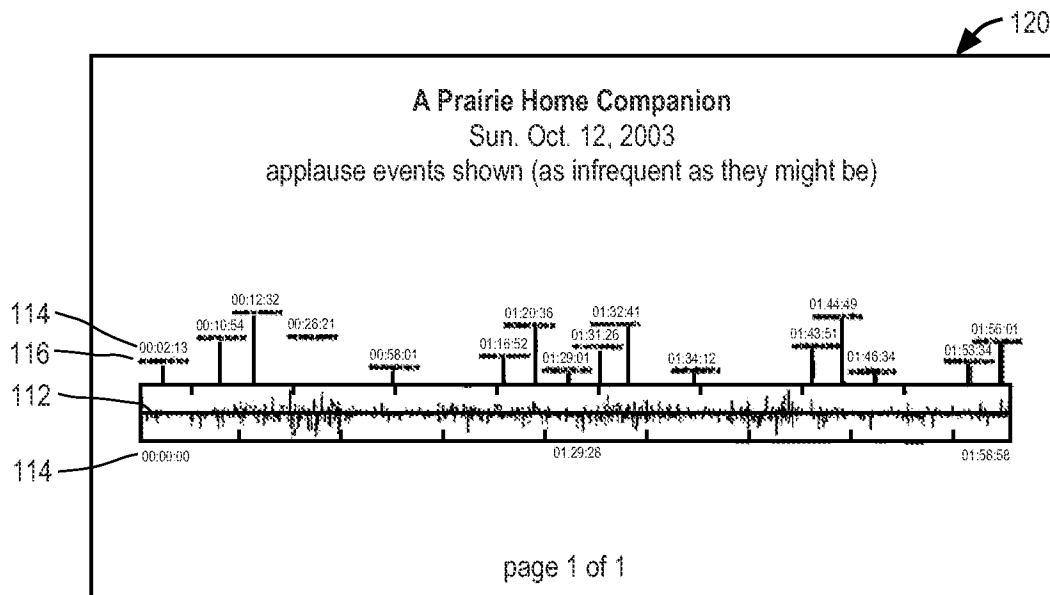
Layout meta data placement = Centered at top of page

Audio Feature Extraction

Audio amplitude extraction and graphical approximation. An svg file is output.

Applause detection outputs time stamps.

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FIG. 11a**FIG. 11b**

104

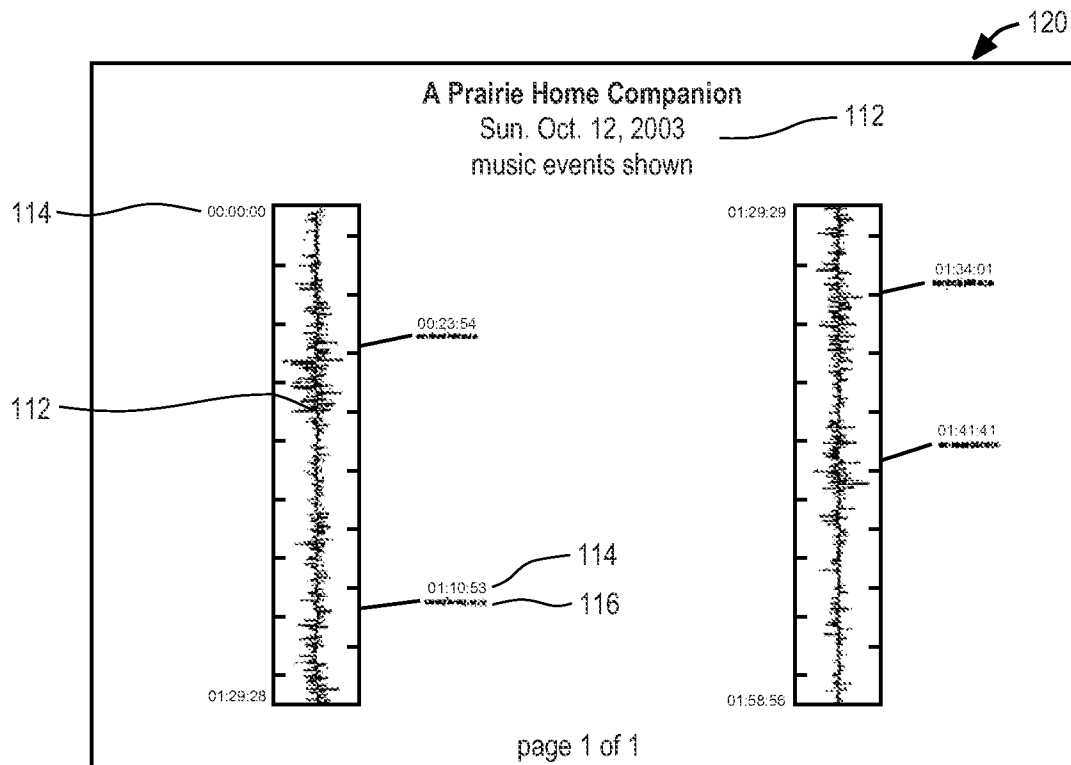
Document Format Specification

Type = Radio program
 Identifier = 1774
 Title = A Prairie Home Companion
 Annotation = music events shown
 Publication Date = Sun. Oct. 12, 2003
 Begin time = 00:00:00
 End time = 01:58:56
 Graphical Representation = Amplitude curve
 702 Feature extraction = music detection delta = 12.93
 Marker type = time stamp, bar code
 Marker placement = right of time line
 Marker frequency = user-defined
 Marker 1 = (00:21:54, bar code, horiz. pos. 1)
 Marker 2 = (01:10:53, bar code, horiz. pos. 1)
 Marker 3 = (01:34:01, bar code, horiz. pos. 1)
 Marker 4 = (01:41:41, bar code, horiz. pos. 1)
 632 Layout type = Two vertical time lines, split in half
 Layout pages = 1
 Layout marker placement = To right of graphical representation, as provided
 Layout meta data placement = Centered at top of page

Audio Feature Extraction

Audio amplitude extraction and graphical approximation. An svg file is output.
 Music detection outputs time stamps.

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FIG. 12a**FIG. 12b**